

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

DUYCK et al.

Application No.: 10/825,065

Filed: April 14, 2004

For: KETONE DIARYLAMINE
CONDENSATES

Group Art Unit: 1714

Examiner: Goloboy, J.C.

Date: February 27, 2008

REPLY BRIEF

Commissioner for Patents
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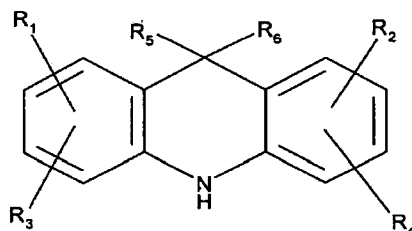
Sir:

The present Reply Brief is being filed in response to the Examiner's Answer mailed December 27, 2007.

1. **Rejection of Claims 1, 5-9, 11-19 and 22 under 35 U.S.C. §103(a) as unpatentable over Wheeler (U.S. Pat. No. 5,268,394) in view of Deetman (RE37,101) in light of Downs et al. (U.S. Pat. No. 5,310,491).**
 - i. **The process limitations of composition Claim 1 impart structure to the claimed composition and must be considered.**

The invention of present Claim 1 is a composition comprising a lubricant and a mixture of antioxidants. The mixture is prepared by the partial condensation of an alkylated diphenylamine selected from the group consisting of mono-, di-, and tri-nonylated

diphenylamine and butylated octylated diphenylamine¹ with an aldehyde or ketone in the presence of an acidic catalyst to yield at least one acridan of the general formula:



wherein R₁, R₂, R₃, and R₄, are independently selected from the group consisting of hydrogen, butyl, octyl, and nonyl, provided that at least one of R₁, R₂, R₃, and R₄ is not hydrogen, and R₅ and R₆ are independently selected from the group consisting of C₁ to C₂₀ hydrocarbyl and Hydrogen. Residual alkylated diphenylamine is not separated from the acridan product and remains in said mixture of antioxidants with the acridan. The mixture of antioxidants also comprises residual alkylated diphenylamine remaining after the partial condensation.

In the Examiner's Answer, citing *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985), the Patent Office maintains that the process limitations of Claim 1 should not be considered for determining patentability since Claim 1 is in product-by-process form. [Answer at pp. 4, 6] Appellants disagree. In *In re Thorpe*, the Federal Circuit indicated:

The patentability of a product does not depend on its method of production. If the product in a product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.

¹ A similar limitation is recited in dependent Claim 12, which depends from independent method Claim 11

Id. (emphasis added). Appellants assert that, contrary to the Patent Office's contention, the process limitations in Claim 1 impact the structure to the claimed combination of diphenyl amine and acridan compounds in the claimed composition, and hence must be considered for purposes of evaluating patentability. *In re Garnero*, 412 F.2d 276, 279, 162 USPQ 221, 223 (CCPA 1979); MPEP §2113 ("The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art").

Specifically, the language of Claim 1 (as well as independent Claims 11 and 22) unequivocally defines a relationship between the alkylated diphenylamine and the acridan that are contained in the mixture of antioxidants. The alkylated diphenylamine contained in the mixture must be structurally capable of forming the acridan.² For example, if a butylated octylated diphenylamine is the diphenyl amine, then the acridan formed therefrom must be a butylated octylated acridan. This structural relationship between the claimed combination of diphenyl amine and acridan compounds must be considered for purposes of determining patentability of composition Claims 1 and 5-9, as well as method claims 11-19 and 22, and cannot be disregarded.

ii. Neither Wheeler nor Deetman disclose or suggest a mixture of antioxidants containing the claimed combination of acridan and diphenyl amine.

Based on the foregoing analysis, in order to establish a *prima facie* case of obvious with respect to pending Claims 1, 5-9, 11-19 and 22, the Patent Office must demonstrate, *inter alia*, a prior art mixture containing: (i) an acridan compound of the claimed structure,

² The mixture may also contain additional alkylated diphenylamines or other antioxidants as reflected by the use of the open-ended transitional phrase "comprising."

and (ii) a diphenyl amine having a chemical structure capable of forming that acridan compound.

The Patent Office relies on Deetman for allegedly teaching a butylated octylated diphenylamine as claimed in presents Claim 1, 5-9 and 12. [Answer at p. 4] The Patent Office also relies upon Wheeler for allegedly disclosing an acridan compound falling within the scope of Claims 1, 5-9, 11-19 and 22. [Answer at p. 3] This position, however, ignores the above-described structural relationship required for the diphenyl amine and the acridan contained in the recited mixture of antioxidants of Claims 1, 5-9, 11-19 and 22. The Patent Office has failed to demonstrate that either Wheeler or Deetman teaches or suggests an acridan compound that may be formed from the butylated octylated diphenyl amine allegedly disclosed in Deetman, e.g., an acridan compound of Claim 1 wherein R₁ and R₂ are butyl and/or octyl groups, and R₃, R₄, R₅, and R₆ are hydrogen. Further, neither Wheeler nor Deetman, separately or in combination, teaches or suggests the claimed combination of acridan and alkylated diphenyl amine required by independent Claims 1, 11 and 22, i.e., where the diphenyl amine is structurally capable of forming the acridan through the recited condensation reaction. For this reason, Appellants maintain that the Patent Office has failed to establish a *prima facie* case of obviousness with respect to pending Claims 1, 5-9, 11-19 and 22.

In rejecting Claims 11-19 and 22, the Patent Office asserted that Deetman “teaches that the acridan and the alkylated diphenylamine may be used in combination (“mixtures thereof”).” [Answer at p. 5] Appellants disagree with this characterization of Deetman. The cited paragraph from Deetman (beginning at Col. 9, line 33 and ending at Col. 10, line 22)

provides a laundry list of antioxidant additives. From this list, one skilled in the art would have no motivation or reasoning whatever for combining the acridan and diphenylamine recited in the pending claims. In fact, the only specific acridan disclosed in Deetman is 9,9'-dimethylacridan, in which R₁, R₂, R₃, and R₄ are all hydrogen, and R₅ and R₆ are methyl (see the above chemical structure). The presently claimed compositions and methods, however, expressly require that “at least one of R₁, R₂, R₃, and R₄ is not hydrogen”. See Claims 1, 11 and 22 (emphasis added). Accordingly, Deetman fails to disclose that the claimed acridan and alkylated diphenylamine may be used in combination.

iii. No motivation or rationale has been provided for combining Wheeler and Deetman.

In rejecting pending Claims 1, 5-9, and 12, the Patent Office also argues that it would have been obvious to one of ordinary skill in the art to use Irganox L57 as the diphenyl amine antioxidant of Wheeler “as Deetman teaches that it is a suitable antioxidant for lubricating compositions.” [Answer at p. 5] Appellants disagree and respectfully assert that the alleged “suitability” of Irganox L57 falls far short of constituting a sufficient rationale to support a *prima facie* case of obviousness under the Supreme Court’s *KSR* standard. *KSR International Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 82 USPQ2d 1385 (2007). According to the Court, “[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *Id.* at 1741 (quoting *In re Kahn*, 441 F.3d 977, 988 (C.A.Fed. 2006) (emphasis added)). The analysis should be made explicit. *Id.* at 1731. Since the Patent Office has failed to explicitly articulate a rationale for combining the

teachings of Wheeler and Deetman, Appellants assert that the Patent Office has failed to establish a *prima facie* case of obviousness with respect to Claims 1, 5-9, 11-19 and 22.

Appellants further assert that the asserted “suitability” of Irganox L57 amounts to an improper “obvious to try” argument. Although permissible in limited circumstances, the *KSR* Court clearly indicated that an “obvious to try” argument should only be employed when “there are a finite number of identified, predictable solutions.” *KSR*, 127 S.Ct. at 1732. In the present case, countless antioxidants are known in the art—hardly the finite number suitable for an obvious to try analysis. In addition, the presently claimed invention relates to the chemical arts, which have long been considered to be unpredictable. For these reasons also, Appellants maintain that the Patent Office has failed to establish a *prima facie* case of obviousness with respect to Claims 1, 5-9 and 12.

iv. Wheeler teaches away from the present invention.

In rejecting Claims 11-19 and 22, the Patent Office argues that “it would have been obvious to one of ordinary skill in the art that the reaction mixture of Wheeler, containing acridans and diphenylamines (column 4 lines 45-48 of Wheeler), was suitable for use as an antioxidant additive without the isolation of the acridan.” [Answer at p. 5] Appellants disagree and reiterate that Wheeler clearly teaches away from the presently claimed invention by indicating (exclusively) that the acridan composition should be purified through distillation. [See Appeal Brief at pp. 10-11; Wheeler at Col. 4, lines 39-49] The teaching away from the present invention by Wheeler is strong evidence of non-obviousness. *W.L. Gore & Associates v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983) (art must be considered in its entirety including portions that would lead away from the claimed invention); *In re*

Haruna, 249 F.3d 1327, 58 USPQ2d 1517 (Fed. Cir. 2001) (“A prima facie case of obviousness can be rebutted if the applicant . . . can show “that the art in any material respect taught away” from the claimed invention.”) (citations omitted). The Patent Offices’ naked assertions to the contrary simply have no basis in the art of record.

v. Economics of the present invention

On page 7 of the Examiner’s Answer, the Patent Office presents arguments concerning the economics of the present invention relative to the Wheeler patent. Specifically, it was asserted that “the cost of the appellant’s process versus the process of Wheeler cannot be judged.” [Answer at p. 7] Appellants disagree and again point out that Wheeler at column 4, lines 40-55, indicates that the crude reaction mixture, which contained diphenylamine, dimethylacridan, isopropyl diphenylamine and dimers and trimers of various alkylated diphenyl amines were carefully fractionally vacuum distilled. Regardless of the financial economics of the reaction system described in Wheeler versus those of the presently claimed invention, it cannot be disputed that the claimed invention eliminates a step indicated as necessary in Wheeler. All other aspects being equal, the elimination of a step from the Wheeler process should be considered a recognizable advantage of the present process over any comparable process of the prior art. None of the secondary references supplements this deficiency of Wheeler. In no case is there any hint of the use of unseparated product containing the claimed acridan and residual alkylated diphenylamine as an antioxidant for a lubricant.

2. **Conclusion**

For the reasons set forth in the Appeal Brief, as well as the additional reasons presented herein, the rejections of pending Claims 1, 5-9, 11-19 and 22 under 35 U.S.C. §103(a) are not properly founded in the statute, and should be reversed.

Appellants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 625-3500. All correspondence should continue to be directed to the address given below.

Respectfully submitted,

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